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AUTHOR Dev, Poonam C.
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ABSTRACT

This paper reviews the research literature on the intervention methods practiced to enhance, and the measures used to assess, academic intrinsic motivation in the school-age population with learning disabilities (LD). According to the research surveyed, retention and generalization improve when learning is intrinsically rather than extrinsically motivated; intrinsic motivation is strongly associated with academic achievement in students with LD; and motivational orientation has certain causation factors, such as perceived locus of control, level of self-esteem, and expectation of success. The literature review also found that training students with LD to attribute performance outcomes to their own efforts rather than to external factors, like luck, can make a significant difference to their level of academic intrinsic motivation. Since students with LD usually do not attribute their successes and failures to their own ability and effort, the paper concludes there is a need to incorporate motivational theories into intervention programs and to train students to attribute performance outcomes to their own efforts. Reliable assessment procedures are required to measure these effects. (Contains 59 references.) (DB)

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Running Head: Motivation and LD

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Intrinsic Motivation and the Student With Learning Disabilities.

Poonam C. Dev

Purdue University

Address: Department of Educational Studies, LAEB, Purdue University, West Lafayette, Indiana 47907

Telephone number: (317) 495-1105

EC305299

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Abstract

Learning has been found to be enhanced by intrinsic motivation. In fact, researchers have found that retention and generalization improve when learning is intrinsically motivated rather than extrinsically (Beck, 1978; Deci, 1975; Mastropieri & Scruggs, 1994; Woolfolk, 1990). Academic intrinsic motivation has been found to be significantly related to achievement in both students with (Adelman, 1978; Adelman & Taylor, 1986; Deci & Chandler, 1986; Deci, Hodges, Pierson, & Tomassone, 1992; Switzky & Schulz, 1988) and without (Deci, 1975; Deci & Ryan, 1985; Gottfried, 1983; Uguroglu & Walberg, 1979) learning disabilities. This is a review of reports that focus on (1) the intervention methods practised to enhance academic intrinsic motivation, and (2) the measures used to assess the academic intrinsic motivation in the school-age population with learning disabilities (LD). The results of this review showed that intrinsic motivation was found to be strongly associated with academic achievement in students with LD. It was also found that training students with LD to attribute performance outcomes to their own effort rather than to external factors, like luck, could make a significant difference to their level of academic intrinsic motivation.

Intrinsic Motivation and the Student With Learning Disabilities.

Introduction

All human beings are said to have an inherent tendency towards being intrinsically motivated (Mills, 1991). To help students with learning disabilities (LD) achieve success in school learning, it is imperative to examine relevant aspects of academic intrinsic motivation. For over two decades, psychological theory has been attempting to create a clear understanding of the somewhat nebulous concept of intrinsic motivation (McReynolds, 1971). Researchers have defined motivation more as a variety of interrelated factors than as just a concept by itself. Motivation has been defined as a set of motivational variables, and is said to be determined by the type of choices made, level of persistence, and enthusiasm for attaining the specified goal (Beck, 1978), as well as time spent on task and the quality of performance (Loveland & Olley, 1979).

Motivation to complete a task is said to be based on the participant's level of interest and the nature of the challenge. Intrinsic motivation has usually been defined as motivation that arises from the need to know more about a certain topic and the need to excel at something (Deci, 1975; Gottfried, 1983), out of interest or curiosity (Deci & Ryan 1980a; Gottfried, 1983; Woolfolk, 1990), from the desire to engage in an activity purely for the sake of participating in and completing a task (Bates, 1979; Deci, Vallerand, Pelletier, & Ryan, 1991), and the "desire to contribute" (Mills, 1991). It has also been defined as a process which results in the person beginning as well as persisting with and even enjoying challenging tasks (Adelman & Taylor, 1990; Gottfried, 1983; Schunk, 1991).

An individual who is intrinsically motivated is said to not need any type of reward or incentive to initiate or complete an assigned task (Beck, 1978; Deci 1975; Woolfolk, 1990). Extrinsic motivation, on the other hand, has been found to be based upon the rewards offered for doing something (Bates, 1979; Woolfolk, 1990), or on the chances of avoiding punishment (Adelman & Taylor, 1990; Ainslie, 1979; Woolfolk, 1990).

Researchers have identified three fundamental psychological needs as the forces that motivate an individual intrinsically to seek out challenges - a desire to feel (a) self-determining, (b) competent, and (c) connected to others (Adelman & Taylor, 1990; Deci & Ryan, 1980a; Deci & Ryan, 1980b; Gottfried, 1983). Self-determining behavior allows the learner to choose, whereas controlled behavior expects her/him to comply (Deci & Ryan, 1980b; Deci et al., 1991). Children's academic intrinsic motivation has been found to be distinguished into subject areas, and is defined as their enjoyment of learning, interest in novelty, ability to persist with and enjoy challenging tasks (Gottfried, 1983).

Motivation to complete an academic task is seen as contingent upon not only its utility value, but also its interest level and the possibility of success (Schunk, 1991; Woolfolk, 1990). Studies done on the significance of academic intrinsic motivation, have found that children with higher academic intrinsic motivation function more effectively in school (Adelman, MacDonald, Nelson, Smith, & Taylor, 1990; Adelman & Taylor, 1990; Boggiano & Barrett, 1992; Gottfried, 1990; Soto, 1988). Students with LD generally possess low academic motivation and frequently demonstrate unfavorable attitudes towards school learning (Adelman, Lauber, Nelson, & Smith, 1989; Wilson & David, 1994).

For the purposes of this review, "intrinsic motivation", in general, will be defined as the need to participate in an activity purely for the sake of gaining knowledge or out of curiosity or interest, without the expectation of a reward or an incentive of any kind. Also for the purposes of this review, "extrinsic motivation", in general, will be defined as the need to participate in an activity contingent upon the reward and/or incentive offered.

The purposes of this review are (1) to examine reports on intervention methods practised to enhance academic intrinsic motivation, and (2) to identify some of the measures used to assess academic intrinsic motivation in a section of the school-age population with LD. A review and synthesis of relevant literature will help identify the critical factors affecting intrinsic motivation, as well as the effects of intrinsic motivation on the academic achievement of students with LD.

Motivational Orientation and Training

Strategy Development

To develop an effective educational program for students with LD, their motivational orientation should be taken into consideration (Adelman, 1978; Adelman & Taylor, 1986). Their motivational characteristics can either improve achievement by compensating for their lack of certain abilities, or intensify their learning disability (Switzky & Schulz, 1988).

Students with LD have a tendency to attribute causes of success or failure to external factors such as luck or people significant to their academic achievement (Bryan & Pearl, 1979; Lewis & Lawrence-Patterson, 1989; Mastropieri & Scruggs, 1994; Schunk, 1991; Schunk & Cox, 1986; Smith, 1994), and this perception has been used to predict their achievement in school learning with a high degree of accuracy (Chapman, 1988; Deci, et al., 1992; Lewis &

Lawrence-Patterson, 1989). Therefore, helping students to learn to attribute task outcomes to factors such as effort and strategy use should improve their academic achievement. Students with LD can be taught to deal more effectively with failure by attributing the causes of failure to factors such as the quality and quantity of effort (Shelton, Anastopoulos, & Linden, 1985).

Academic self-concept has been shown to be strongly related to academic intrinsic motivation in students with LD (Grolnick & Ryan, 1990; Pearl, Bryan, & Donahue, 1980; Schunk, 1991). Therefore, it is important to make intrinsically motivated behavior the goal of educational programming for students with LD by encouraging self-determined functioning in the learner (Deci & Chandler, 1986; Lewis & Lawrence-Patterson, 1989). The programs should promote the desire to explore and take on new challenges, without the expectation of extrinsic rewards. Intrinsic motivation is affected by extrinsic rewards and controls, and is more appropriate for creative work or learning without the interference of these external agents (Benninga et al., 1991; Butler, 1989; Deci, 1975; McCullers,Fabes, & Moran III, 1987). Controls, in the form of events or contexts that are rewarding or punishing, pressure the individual to behave in specified ways, and are detrimental to self-determination (Deci & Chandler, 1986).

Review of Research

Assessment of factors which identify academic intrinsic motivation is imperative to the development of an intervention program for the student with LD. Also important is an examination of intervention programs developed by researchers and educators in this field. An important issue relevant to the education of students with LD is whether the information

available in these two areas (of assessment and intervention) is supported by empirical evidence. There is a paucity of achievement motivation research for students with LD (Adelman, 1978; Adelman, et al., 1990; Grolnick & Ryan, 1990). Only four reviews of research were found, spanning the last 16 years (1980-1996), which dealt, even remotely, with the academic intrinsic motivation of school-age population with LD. Following is a brief outline of these reviews.

Borkowski, Weyhing, and Carr (1986) reviewed literature on strategy acquisition use, and transfer of students with LD and mental handicaps. The authors presented a model of metacognition that integrate three components believed to interact in influencing the acquisition and transfer of a strategy. These components - Specific Strategy Knowledge, Metamemory Acquisition Procedures, and General Strategy Knowledge - were used to explain some causes of individual differences in strategy use. The authors concluded that academic intrinsic motivation is significantly correlated to the achievement and self-efficacy beliefs of students with LD and mental retardation.

Bryan and Pearl (1982) discussed the effect of mainstreaming on the beliefs of students with LD about themselves, and the influence of those beliefs on their social and achievement related behaviors. The authors reported a number of studies in an attempt to explain these relationships. The studies used elementary and junior high school students with and without LD, and examined group differences on a variety of self-report and behavioral measures, for example, attributions. The authors concluded that students with LD devalue their own performance, respond to academic challenges by disengaging themselves, and are submissive during

interpersonal interactions. Although the authors recommend attribution retraining for students with LD, they also point out the drawbacks of such a training.

McPhail and Stone (1995) focused on issues related to self-concept of adolescents with LD. They presented a summary of research on the self-concept of adolescents with LD, and examined factors said to be related to the formation of self-concept. They also examined the relationship between self-concept and motivation to learn. The authors suggested that there was evidence to support that motivation to learn was greater in those adolescents with LD who had high levels of self-concept.

Switzky and Schulz (1988) presented various conceptions of intrinsic motivation, and examined methods of identifying individual differences in motivational orientation. They also discussed the interaction of classroom environments, the effects of reward and punishment, and individual differences in intrinsic motivation of students with mild disabilities in relation to behavioral effectiveness and academic performance. The authors make recommendations for the education of students with mild disabilities, and for research in that area. They strongly suggest that educational programs contain a motivational component for maximum achievement.

Previously published reviews of research dealing with topics of assessment and intervention in the area of academic intrinsic motivation of students with LD focused on: (a) strategy acquisition, use, and transfer (Borkowski, et al., 1986); (b) the influence attributional beliefs have on social and achievement related behaviors (Bryan & Pearl, 1982); and (c) the implications of current theories of intrinsic motivation for educational programming of learners with mild disabilities (Switzky & Schulz, 1988). However, there are some questions which still

remain unanswered. What are the measures used to assess intrinsic motivation in students with LD? What are some effective ways to develop academic intrinsic motivation in learners with LD? How is academic achievement affected by attribution training? A review and synthesis of relevant literature was undertaken to find answers to these questions.

Empirical Evidence

Literature Search Procedure

The studies reviewed were the result of a series of computer searches, as well as of manual searches of bibliographies of articles dealing with research, various standard social science abstracts (Psychological Abstracts, Sociological Abstracts, etc.), and listings of unpublished materials (ERIC, Dissertation Abstracts International). The descriptors used were: intrinsic motivation and learning disabilities. The reference lists of major journals (Learning Disabilities Research and Practice, Learning Disability Quarterly, Teacher Education and Special Education, American Educational Research Journal, Journal of Educational Psychology, Journal of Learning Disabilities, among others) were hand searched. All reports that appeared eligible on the basis of the title and abstract were retrieved. The criteria for including the studies selected were: (1) those which dealt with the assessment of academic intrinsic motivation in students with LD, (2) those which dealt with intervention strategies to enhance the academic intrinsic motivation of students with LD, and (3) those which dealt with school-age population.

Overall Characteristics

Altogether, 14 studies were found which met the specified criteria, and could, therefore, be included in the final selection. These studies were published in the last two decades, between

1974 and 1996. Most of the studies were implemented with children classified as having LD (N=8); with combinations of subjects, including students with LD and students who were identified as underachievers (N=2); students with LD, severe emotional disturbance, and autism (N=1); and students with and without LD (N=4). Studies were classified according to whether they dealt with assessment or intervention aspects of intrinsic motivation. Half the studies (N=7) dealt with intervention strategies, while the other 50% of the studies could be characterized as those dealing with assessment procedures.

Intervention studies (see Table 2) examined the effects of attribution retraining, strategy training, and involvement in the decision making process on the subsequent academic intrinsic motivation of the students. These studies were completed in and after 1982, while the assessment research was completed over the last two decades. Research dealing with assessment of academic intrinsic motivation of students with LD (see Table 1) examined factors designated as motivational: interest in task/willingness to participate (N=2), and time on task (N=1). The assessment studies also covered performance on standardized tests designed to measure academic intrinsic motivation (N=5), as well as teacher/observer ratings (N=2).

Overall, the research reports have been organized into (a) assessment procedures, and (b) intervention strategies, and are reviewed in this order. Tables 1 and 2 represent a breakdown of the studies dealing with assessment procedures and intervention strategies respectively. Finally, research findings are synthesized with regard to the impact of motivational orientation on the academic achievement of students with LD.

Assessment Procedures

Search procedures for this study revealed a paucity of reliable research data on effective strategies to enhance intrinsic motivation with a view to improving academic achievement of students with LD. Intrinsic motivation needs to be accounted for in a systematic and comprehensive manner by identifying valid and reliable assessment procedures. This could lead to the development of strategies to enhance intrinsic motivation in students with LD (Adelman, et al., 1989).

Adelman, et al. (1989) investigated the degree to which a computer game learning task can improve task performance of students diagnosed as having LD. The primary focus was on assessing the ability and motivation to learn and participate in the task assigned. A strong relationship was found between the mean initial motivation index and the initial mean ability ratings and base mean performance scores. Overall, the students wanted extra practice time and continued participation. The computer game was shown to be highly motivating, and as a result, a high percentage of the students diagnosed as having LD achieved desired learning.

Adelman, et al. (1990) examined the implications of the relationship between motivational readiness and actual participation in decision making of 85 students with LD. The researchers found significant differences between subjects with high and low motivational readiness. Their motivational readiness was positively related to the frequency and level of their participation in making decisions. The researchers suggest that intervention strategies for students with LD should incorporate a motivational component, besides skill development, for successful outcomes.

Adelman & Taylor (1983a) reported their findings on categorizing a student's inferred level of motivation to learn and to relate such motivation to her/his degree of learning ability and misbehavior. The subjects were 37 students with LD. Teachers recorded their time on/off task, level of motivation, and attendance modifications. The researchers found significant group differences on achievement tests given at the end of the year, with the ones diagnosed with high intrinsic motivation retaining a higher percentage of acquired learning - 75% or more. According to the authors, such inferential classifications appear to be significantly related to the student's involvement in learning activities.

Black (1974) assessed the correlation between the measures of self-concept and academic achievement of 50 elementary students with LD. Significantly negative correlations were found for self-concept scores, and age and grade levels of the whole sample. According to the author, students with LD who are below grade level in reading tend to view themselves more negatively than do similar students with LD, but with normal reading scores.

Grolnick & Ryan (1990) examined the self-perceptions, motivational orientations, and classroom adjustment of 148 students. The participants included students with LD, matched-IQ students without LD, randomly selected students without LD, and low-achieving children. The researchers concluded that students with LD see themselves as less competent than their nondisabled peers, but the same as underachievers. There was no significant correlation found between self-perception and locus of control for any of the groups. According to the researchers, students with LD saw powerful others as being in control of their success and failure outcomes.

Soto (1988) examined the differences in the motivational orientation of 28 higher- and 29 lower-achieving fifth-grade and sixth-grade Puerto Rican students. The students were administered A Scale of Intrinsic versus Extrinsic Orientation in the Classroom to assess their motivational orientation. The difference between the groups was found to be significant. Higher-achieving subjects tended to have an intrinsic orientation, while the lower-achieving subjects tended to demonstrate extrinsic orientation. The author suggests that teachers may have to provide necessary feedback to students who are extrinsically orientated.

Wilson and David (1994) investigated the school attitudes and academic intrinsic motivation of 89 students with LD in Grades 4 through 8. The participants were administered the School Attitude Measures (SAM) and the Children's Academic Intrinsic Motivation Inventory (CAIMI). The students with LD were found to have significantly lower academic intrinsic motivation as compared to the normative sample without disabilities. The researchers found no significant difference between minority and non-minority students with LD. The students with LD were shown to view the school environment similarly to the normative sample without disabilities. However, perceptions about performance and personal control over their own performance were found to be significantly lower and more negative for students with LD.

Summary.

The reports (N = 7) dealing with assessment of academic intrinsic motivation in students with LD (N = 350) measured a variety of factors considered to be evidence of intrinsic motivation (N = 4), or factors believed to affect intrinsic motivation (N = 4). Some of the studies used standardized tests to measure academic intrinsic motivation (N = 4). The factors measured

were: willingness to participate in the task/activity (N = 3), the amount of time spent on the task/activity (N =2), desire to continue with/repeat the task/activity (N = 2), mastery learning (N = 1), curiosity (N = 1), self-efficacy (N = 2), self-concept/self-esteem (N =3), participation in decision making (N = 1), and locus of control/motivational orientation (N = 3).

Insert Table 1 about here

Intervention Strategies

Motivational factors can enhance learning or increase learning and performance problems, but if a student is intrinsically motivated, she/he can often achieve much more than expected (Adelman & Taylor, 1983b). It is the educator who can help the student by introducing her/him to effective strategies to enhance motivation as well as to bring about improved learning (Dev, in press). Poor academic skills and negative attributions may result in reduced effort as well as decreased motivation to tackle subsequent assignments (Fulk & Mastropieri, 1990).

Adelman & Chaney (1982) reported the findings from two studies focusing on differential effects of strategies to enhance motivation. One study involved 59 students without disabilities aged 9.9 to 11.6 years; the other study included 77 students with LD aged 7 to 16 years. Results showed no significant group or gender difference. Only 2 in the group without disabilities refused to participate, while 10 students with LD refused. Almost all the subjects without disabilities performed well on both administrations. Those students with LD who chose to volunteer, scored significantly higher and seemed to show additional improvement as

compared to the other sub-groups among the subjects with LD. The researchers cautioned that volunteering could be a sample biasing variable.

Borkowski, Weyhing, and Carr (1988) investigated the effects of attributional retraining on strategy-based reading comprehension of 75 students with LD. Subjects were divided into groups, and either received attribution retraining and strategy training, or only strategy training, or no training at all. Subjects in the combined attribution conditions seemed to show about a 50% improvement in reading comprehension levels, as compared to only a 15% improvement by those in the strategy only condition. According to the researchers, remediation of comprehension deficits in students with LD can be brought about by including motivational components in the intervention program. The authors feel that without attributional retraining, strategy training will not be effective for students with LD. However, they caution against generalizing these results for students with LD who have had negative attributional beliefs for a long period of time.

Fulk, Mastropieri, and Scruggs (1992) investigated the effect of mnemonic generalization and attribution training on 56 adolescents with LD. One-to-one training sessions covered strategy usage across a variety of content domains, including vocabulary learning, science, and social studies. According to the researchers, the results showed no significant group differences between students who did and did not receive attribution training.

Shelton, et al. (1985) investigated the effects of altering causal attributions for failure on 16 students with LD, and on 16 students without LD. They were assessed on reading tasks varying in difficulty levels. According to the researchers, the results of the study supported their hypothesis that an attribution training approach can be effective in helping students with LD

persist with difficult academic tasks. They found that task persistence was increased with altered attributional styles.

Okolo (1992) examined the effects of attributional retraining on the attributions, persistence, and mathematics computation of 29 seventh- and eighth-grade students with LD. According to the author, results did not show any significant impact on students' attributions as a result of attribution retraining. The author suggests that computer-based feedback that students were succeeding due to their effort may have undermined beliefs in their abilities. The author states that there were no reliable pre- to posttest differences detected in the data.

Rawson (1993) assessed the effects of intensive short-term remediation on the academic intrinsic motivation of 42 boys with LD in a residential summer school. The program lasted for 10 days, and was designed to promote individual learning, cooperative learning, and competitive learning. Each of the subjects was measured on the CAIMI to assess their academic intrinsic motivation. The participants were found to be significantly below normative grade levels in all areas of academic intrinsic motivation as measured by the CAIMI on both pre- and post-tests. Results of the training program showed modest but significant increases in reading, math social studies, science and general CAIMI scores for correlated samples. According to the author, many aspects of the program might have been the cause in increasing academic intrinsic motivation. The researcher clarified that the CAIMI is specifically designed to measure "intrinsic, not extrinsic academic motivation in children". He also cautioned that long-term effectiveness of such programs had not been proved.

Schunk and Cox (1986) investigated the effects of verbalization and effort-attributional feedback on the self-efficacy and skillful performance of 90 students with LD from Grades 6 through 8. The students received training and solved problems over six 45-minute sessions. They were asked to rate their attributions on four scales: ability, effort, task difficulty, and luck. This test assessed students' perceived capabilities for correctly solving different types of subtraction problems. The results showed that overt verbalization of the steps of the problem solution and their application to problems facilitated task performance, self-efficacy, and computation skills. The results also showed that effort-attributional feedback for students' problem-solving successes led to higher self-efficacy and subtraction skills. The authors suggest that verbalization might assist students with LD to work in a more systematic manner, and that early effort feedback served to highlight the role of effort as a cause of success.

Summary.

Strategies to enhance academic intrinsic motivation in students with LD (N = 385) were reported in seven studies. Students were trained to attribute performance outcomes to factors they could control, such as effort (N = 4), ability (N = 1), and effective use of strategies (N = 2). To enhance their academic intrinsic motivation, they were given effort feedback (N = 1), were allowed to play an important role in the decision making process (N = 1), and participated in an intensive short-term remedial curriculum (N =1). One study showed no significant change in academic intrinsic motivation after attribution training (Okolo, 1992), and another showed that there was no significant difference in academic achievement after attribution training as

compared to strategy training (Fulk, et al., 1992). The remaining studies (71%) showed the positive outcomes of attribution training on academic intrinsic motivation.

Insert Table 2 about here

Discussion

Motivational orientation has been found to have certain causation factors, some of the most important being - perceived locus of control, level of self-esteem, and expectancy of success (McPhail & Stone, 1995; Weiner, 1979). Enhancing the motivation of a student with LD, may help them to overcome some of the disadvantages caused by their disability (Borkowski, et al., 1982; Smith, 1994; Switzky & Schulz, 1988). LD and low self-concept have been shown to be related (Black, 1974). Students with LD often have an external locus of control, and lack motivation. They tend to blame luck or other external factors for their poor performance (Mastropieri & Scruggs, 1994; Shelton et al., 1985; Smith, 1994; Tarnowski & Nay, 1989). This usually results in them giving up easily. An individual who derives satisfaction from an accomplishment resulting from her/his own effort, is likely to be intrinsically motivated (Bates, 1979; Deci, 1975), and improve academically, even though she/he may have LD (e.g., Adelman & Chaney, 1982; Borkowski, 1988). Therefore, training students with LD to attribute performance outcomes to their effort can make a significant difference to their academic intrinsic motivation.

Conclusion

Based on the research reviewed, it may be concluded that intrinsic motivation is strongly related to academic achievement in students with LD. If students with LD attribute successful outcomes to their own effort, they are more likely to be intrinsically motivated (Adelman, 1978; Black, 1974). Self-perception of competency has been shown to be significantly related to academic intrinsic motivation (Grolnick & Ryan, 1990; Schunk, 1991). Research has also shown that students with LD depend on teachers for motivation (Grolnick & Ryan, 1990). However, the attributional retraining of children with LD should be carefully considered (Adelman & Chaney, 1982; Jacobsen, Lowery, & DuCette, 1986; Okolo, 1992). Students with LD have been shown to generally have more maladaptive causal attributions than their peers without LD (Chapman, 1988; Deci, et al., 1992; Dohrn & Bryan, 1994; Kistner, Osborne, & LeVerrier, 1988; Lewis & Lawrence-Patterson, 1989; Mastropieri & Scruggs, 1994; Pearl, Bryan, & Donahue, 1980; Pearl, 1982; Shelton et al., 1985). They usually do not attribute their successes and failures to their own ability and effort.

There is a need to incorporate motivational theories into discussions of LD (Adelman, 1978; Adelman & Taylor, 1986). Intervention programs designed for students with LD are not likely to be successful without a motivational component being included in them (Adelman, et al., 1990; Borkowski et al., 1982). Empirical evidence of the effects of intrinsic motivation on the academic achievement of students with LD can be very useful for developing guidelines for effective intervention strategies for this population (Adelman & Chaney, 1982; Deci & Chandler, 1986; Switzky & Schulz, 1988). Reliable assessment procedures are required to measure these

effects, as well as to identify the components of academic intrinsic motivation. The teacher's inference of a student's academic intrinsic motivation can provide important information for program development (Adelman & Taylor, 1983a).

The amount of research reviewed is evidence of the limited number of studies which address issues specifically focused on academic intrinsic motivation of students with LD. With a view to overcoming this limitation, the author recommends further research in these areas. The results of this review have implications for practice and further studies focusing on the assessment of academic intrinsic motivation, and development of intervention methods to enhance the academic intrinsic motivation of students with LD. The aim being, to enable all students to achieve and retain the maximum learning possible.

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Table 1: Assessment Procedures (N = 7)

Author(s)	Sample	Tasks/Tests	Measures	Results
Adelman, et al., 1989	N = 78, LD = 23 M age=14.5 yrs Non-diagnosed=31 M age=14.4 yrs Mixed (LD, EH, and autistic) = 24 M age=15.8 yrs	Performance on computer games, and ratings on Likert type scales	Learning achieved, Willingness to participate and continue on task, Self-efficacy and expectations of outcomes	Positive findings for achievement based on motivation
Adelman et al., 1990	N = 85 LD = 85 M age=11.7 yrs	Ratings on Likert type scales	Frequency and quality of participation, Perceived locus of control	Motivational readiness positively related to level and quality of participation
Adelman & Taylor, 1983a	N = 37 LD = 37 Age=9-18 yrs	Teacher reports, scores on the Piers-Harris Self-Concept Test, and the California Achievement Test	Time on/off task, Willingness to participate, Attendance modifications, Test scores, Learning retention	Inferences were significantly related to the students' academic intrinsic motivation
Black, 1974	N = 50 LD = 50 M age=11.4 yrs	WRAT, WISC, and the Piers-Harris Children's Self-Concept Test	Test scores, Correlation between self-concept and achievement	LD and low self-concept inter-related
Grolnick & Ryan, 1990	N = 74 LD = 37 Non LD = 37 random LD =37 Low achievers = 37 Age not given Grades 3-6	Perceived Competence Scale, Academic Self-Regulation Questionnaire, Multidimensional Measure of Children's Perceptions of Control, Teacher Rating Scale, and Teacher-Classrom Adjustment Rating Scale	Test scores, Perception of self-worth, and locus of control, Teacher inferences of competence, self-esteem, and motivation	Students with LD derive motivation and self-perceptions from teachers and other significant adults

Soto, 1988	N = 57 High achievers=28 Low achievers=29 Age not given Grades 5 & 6	A Scale of Intrinsic versus Extrinsic Orientation in the Classroom	Test score, Preference for challenge, Interest in the task, Mastery learning, Ability to judge, Dependance on extrinsic factors	Level of achievement mastery found to be strongly related to motivational orientation
Wilson & David, 1994	N = 89 Age not given Grades 4-8	The SAM and the CAIMI	Test scores, Attitude, Academic intrinsic motivation	Academic intrinsic motivation scores and perceptions of control found to be lower for students with LD

Table 2: Intervention Strategies (N = 7)

Author(s)	Sample	Tasks	Measures	Results
Adelman & Chaney, 1988	N = 77 LD = 77 M age=13.8 yrs Non-disabled = 59 M age=10.9 yrs	Coding sub-test of WISC-R, Participation by choice only	Willingness to participate	Volunteers with LD scored significantly higher
Borkowski, et al., 1988	N = 75 LD = 75 Age=10-14 yrs	Trained in attributes and/or strategies Training period not specified	Reading comprehension, Perception of control	Subjects who received strategy and attribution training improved 50%, Those who got only strategy training improved only 15%
Fulk, Mastropieri, & Scruggs, 1992	N = 56 LD = 56 M age=13.10 yrs	Attribution training for 50 mins. over two days	Information recall, Attributions	No significant difference in level of recall after training
Okolo, 1992	N = 29 LD = 29 M age=13.3 yrs	Subjects trained for 50 mins.	Attributions, Task persistance, Skill attainment	No reliable pre- to post-test differences detected
Rawson, 1993	N = 42 LD = 42 M age=11 yrs	Ten-day intensive program	CAIMI scores, and Ability in reading, math, social studies, and science	Statistically significant increase in academic intrinsic motivation
Schunk, & Cox, 1986	N = 90 LD = 90 M age=13.7 yrs	Trained for 4 hrs. 30 mins. in subtraction	Self-perception of Attribution, and Self-efficacy	Effort attributional feedback improved perception of self-efficacy, and subtraction skills
Shelton, Anastopoulos, & Linden, 1985	N = 32 LD = 16 Non LD = 16 Age=9.6-13.5 yrs	Subjects trained for 3 hrs. over three weeks	Task persistance, Attributing outcomes to effort variables	Significant improvement in students with LD